

# PATENT SPECIFICATION

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DRAWINGS ATTACHED

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## (54) DEVICES INCLUDING PIECES OF ALUMINIUM OR AN ALLOY OF ALUMINIUM AND LAYERS OF ELECTRICALLY CONDUCTIVE MATERIAL WELDED TO SAID PIECES

(71) We, SIEMENS AKTIENGESELLSCHAFT, a German Company, of Berlin and Munich, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a device including a piece of aluminium or an alloy of aluminium electrically connected to a copper conductor.

The aluminium or aluminium alloy piece may be a bus bar, contact carrier or contact bridge, for example.

Copper conductors cannot be satisfactorily directly connected to pieces of aluminium or aluminium alloy, in contact with them, by screw connectors or clamping means on account of the high contact resistance. To solder copper conductors directly to aluminium or aluminium alloy pieces is difficult and the results are often unsatisfactory.

According to the present invention there is provided a device including a piece of aluminium or an alloy of aluminium, a layer of electrically conductive material welded to said piece by ultrasonic spot welding or by ultrasonic roll seam welding and a copper conductor soldered to the layer or secured in contact with it by screwing or clamping.

The layer may be made of copper, brass, gold or silver or a composite layer consisting of a layer of copper face to face with a layer of aluminium may be used.

In mass production, a continuous layer of electrically conductive material may be welded on a continuous strip of aluminium or aluminium alloy by ultrasonic roll seam welding, this welded assembly then being continuously fed to a device for connecting copper conductors to the layer and then

to a device for shearing or stamping out strips from the assembly.

For a better understanding of the invention, and to show how the same may be carried into effect, reference will now be made, by way of example, to the single figure of the accompanying drawing which shows an oblique view of an aluminium piece and a copper layer being welded to it by ultrasonic roll seam welding to produce part of a device according to the invention. The device is completed by soldering a copper conductor to the copper layer or securing the copper conductor to the copper layer by screwing or clamping.

There is denoted by 11 a piece of aluminium, by 12 a layer of copper, by 13 a sonotrode and by 14 an anvil roll. The copper layer 12, which has a width of 10 mm. and a thickness of 0.3mm., is welded to the piece of aluminium 11, of a thickness of 1mm., by ultrasonic roll seam welding.

Instead of the copper layer, there may be welded on to the aluminium piece by ultrasonic spot welding, composite foil discs which consist of a layer of copper face to face with a layer of aluminium, the foil having a diameter of 7mm. and a thickness of 0.1mm.

### WHAT WE CLAIM IS:—

1. A device including a piece of aluminium or an alloy of aluminium, a layer of electrically conductive material welded to said piece by ultrasonic spot welding or by ultrasonic roll seam welding and a copper conductor soldered to the layer or secured in contact with it by screwing or clamping.

2. A device as claimed in claim 1, wherein the layer is made of copper or brass.

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3. A device as claimed in claim 1, wherein the layer is made of a layer of copper face to face with a layer of aluminium.

5 4. A device as claimed in claim 1, wherein the layer is made of gold or silver.

HASELTINE, LAKE & CO.,

Chartered Patent Agents,  
28, Southampton Buildings,  
Chancery Lane,  
London, W.C.2A 1AT.  
Agents for the Applicants.

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1 SHEET

COMPLETE SPECIFICATION

*This drawing is a reproduction of  
the Original on a reduced scale.*

